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ABSTRACT

In physical activities, students' attitudes, values, and motivations change during their school years. Two theories concerning these changes are that teacher-student interactions and teachers' behaviors will differ according to the age level of the student groups and that evaluation of a teacher's effectiveness should be specific to the population being taught. Observations of physical education classes in elementary, junior high, and senior high schools for teachers' verbal and nonverbal behaviors suggest that both female and male teachers talk more frequently as students' grade levels increase. This is attributed to several possible reasons--the complexity of the material increases, a more analytical approach is used as skill levels increase, and a drop in motivation observed in older students calls for more intervention by the teacher. An observed tendency for student verbal communication to decline with age increase is thought to reflect, to some extent, a decline of childrens' spontaneity. Frequent positive reinforcement by the teacher is an important element at every age level. The affective aspects of physical education are directly linked to the students' lifetime involvement in sports and recreation long after the end of their formal schooling. (JD)

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TEACHING BEHAVIOURS AT DIFFERENT LEVELS OF PHYSICAL EDUCATION TEACHING

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CHRONICLE

TEACHING BEHAVIOURS AT DIFFERENT LEVELS OF PHYSICAL EDUCATION TEACHING*

by

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Providing an objective description of what is going on in class and determining if teacher-student interactions match the teaching style or the planned educational approach constitute the main purposes of teaching analysis.

General observational systems of teacher-student interactions have been applied in physical education activities teaching. Some of these systems have been adapted to fit the physical education setting and a number of new systems have been developed to better account for the specific aspects fo physical education context.

In spite of the host of systems, descriptive data of behaviours and interactions occurring during physical activities are still scarce. Unfortunately, many authors do not go beyond the study of validity and reliability of their systems to the actual application of their instruments in descriptive studies.

In physical activities, the students' attitudes, values and motivations change during their school age. In student centred teaching, as recommended by many current physical education curricula, one might hypothesize that teacher-students interactions and teacher's behaviours will differ according to the groups involved: girls, boys, students of various grade levels, etc. For example, one might suggest that evaluation and affectivity from the teacher should be specific to the population being taught.

M. Demarteau and M. Pieron (1978) showed that the De Landsheere-Bayer system of teacher's behaviour analysis was suitable to represent verbal statements of a teacher during a physical education lesson. Categories defined in this observational system also allow the main non-verbal behaviours to be integrated. Students verbal behaviours and motor activities are not included in this system.

THE OBSERVATION

1. Analysis schedule

a. Teacher's verbal and non-verbal behaviours

Nine behaviour categories constitute the framework of the observational system. Each of these categories are divided into sub-categories usable in

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a refined analysis based on written transcripts. The author limits this study to the main categories employed in a live setting.

The categories are as follows:

1. Organization
2. Content
3. Development
4. Personalization
5. Positive evaluation (feedback)
6. Negative evaluation (feedback)
7. Concretization
8. Positive affectivity
9. Negative affectivity

Operational definitions of each category and coding rules have been described by M. Demarteau and M. Pieron (1978) and by J. Hacourt (1977). A brief review of these rules will be made later in the discussion of the teacher's behaviour.

b. Pupil's verbal behaviours

It remains hard to identify clearly all the pupils' verbal behaviours in live observation. The authors have limited the observation to account for the frequency of these behaviours directed to the class, to a group of students, or to the teacher.

c. Samples of analysis. Reliability checks

A series of preliminary controls instituted to determine:

1. if a reduced time sample could represent behaviours occurring during the entire physical education lesson.
2. the intra-observer (at an eight month interval) and inter-observer reliabilities.

The Spearman rank correlation coefficient was computed between categories, lesson by lesson. The Wilcoxon matched-pairs signed-ranks test was used to check if no significant difference existed in respective categories.

A lesson by lesson analysis on a total of nine lesson showed that an overwhelming majority of r_s were higher than ·80.

Only the content category differs according to the observer or in the same observer. This category needed to be more accurately defined to avoid possible confusion with the development and evaluation categories.

2. Subjects

Twenty-four teachers from the Liège area allowed the investigators to observe two different lessons.

Teachers and students were observed during two five minute periods per lesson. The observation periods selected were between the 10th—15th minutes and between the 25th—30th minutes of the lesson.

All teachers had at least five years' professional experience. The teachers were distributed as follows: 4 female teachers at the elementary level (5th grade), 5 female and 5 male teachers at the junior high school level (8th grade), 5 female and 5 male teachers at the senior high school level (11th grade).

Teachers remained free to choose their subject matter. Generally they did not change their initial planning.

3. Statistical treatment of data

Different categories of events were compared by the Mann-Whitney U Test according to sex and grade levels.

RESULTS AND DISCUSSION

1. Frequency of observed behaviours

a. Teacher's behaviours

Both female and male teachers talked more frequently as students' grade levels increased. Female teachers intervened once every 7·30 sec at the elementary level, once every 6·25 sec at the senior high school level.

The intervention rates significantly differed between the senior high school level and the elementary level ($P = \cdot 05$).

Interventions of male teachers appeared less frequently: once every 8·60 sec (junior high school) and once every 7·95 sec (senior high school).

Without considering the duration of the behaviours, this frequency showed that all teachers were eager to communicate with the students and to organize the class activity. Analysis of different categories of behaviours will emphasize intent of teachers' behaviours: information, organization, changing students' behaviour, affectivity.

The intervention rate increase may have several origins: (1) more complex abilities to be taught, (2) the use of a more analytical approach as skill complexity increases may require more verbal statements, (3) the drop of motivation frequently observed in older students might call for more interventions in order to maintain this motivation at an optimal level.

b. Students' verbal behaviours (Table 1)

They accounted approximately for 12% of all the observed behaviours. This percentage does not substantially differ from those observed in American classes by G. Nygaard, 1971 and by J. Cheffers and V. Mancini, 1978. It is slightly higher than data gathered through a different observational system in physical education student-teachers (M. Pieron and C. Drion, 1977). Nevertheless the variability of the students' verbal behaviours was considerable from one class to another. It happened that students' verbal behaviours amounted to 25% of the total of verbal statements recorded in the class. Students' verbal behaviours seemed to show a trend to be reduced with the age increase.

Table 1 — **Student's talk related to total talk**

	Mean	Min.	Max.
Girls			
Elementary	11·8	5·5	21·6
Junior high school	13·4	7·6	19·5
Senior high school	7·6	4·6	14·0
Boys			
Junior high school	15·6	5·8	25·1
Senior high school	12·8	6·5	19·8

Girl students intervened more frequently and took a more prominent part in the observed behaviours at the junior high school level than at the senior high school level ($P = \cdot 05$). The same comparisons were not significant for boys.

Theoretically it seemed that the interaction must benefit from the intellectual maturation of the students to become more frequent. J. Cheffers and V. Mancini (1978) have observed a slight increase of student talk with age. In fact, it seemed that the increase of communication opportunities do not offset that decline of children's spontaneity. Girls and boys interacted at the same ratios with their teachers.

2. Teaching profile and teacher's behaviours categories (Tables 2, 3, 4)

Female and male teachers present a very similar teaching profile. The rank order of categories remains approximately the same regardless of sex or grade level: organization, content, negative evaluation, positive evaluation . . .

Nevertheless, some significant differences appeared in quantitative values of categories.

a. Organization functions

This category comprised the highest percentage of teacher's interventions. Behaviours recorded in this category ranged from 25 to 35% of the observed events.

This category groups statements dealing with the understanding of abilities, the pace of exercises imposed by teacher, discipline, behaviour conduct of the class, commands at the start and the end of an activity. They do not concern the content or subject matter taught.

Table 2 — **Distribution of various teaching functions, infemale teachers, elementary school level**

Teaching functions	Mean	Min.	Max.
Organization	25·1	18·1	32·8
Content	19·7	17·8	22·2
Development	4·5	3·3	6·6
Personalization	2·6	0	7·3
Positive evaluation	9·5	7·1	11·0
Negative evaluation	25·2	19·4	30·9
Concretization	4·0	0·6	7·2
Positive affectivity	5·3	3·2	7·3
Negative affectivity	5·1	3·9	6·2

This high level of managerial behaviours seems to be a characteristic of teaching physical activities. W. Anderson and G. Barrette (1978) reported that American teachers spend a large part of their time in interventions that we categorize as organizational: organizing, 7·5%, part of preparatory instructing, 14·2%, providing equipment, 2·1%, administering, 4·7%.

Although lower than data found by M. Demarteau and M. Pieron (1978)

in a extensive study of a single teacher, our results are at the same value level than those recorded in student-teachers (M. Pieron and C. Drion, 1977). Nevertheless, data from M. Demarteau and M. Pieron (1978) remain in the range of individual variability of the teachers observed in this present study.

The organizational behaviours reflect a praiseworthy concern to provide the students with the best possible conditions to practice the skill and to repeat it as many times as possible. They are prerequisite conditions to efficient learning. However, these behaviours do not produce a direct educational effect on the learner. Students acquisitions and teacher-pupil interactions could benefit from a slight decrease of the ratio of managerial interventions.

We share the aim of D. Siedentop (1976) to decrease these behaviours to approach as near as possible a ratio 1/1 with the managerial episodes. Using a behaviour modification approach by instructions, graphic feedback, reinforcements and/or behavioural objectives, F. Rife (1973), C. Hughley (1973), K. Hamilton (1974) showed that it was possible to decrease the intervention rate of that function with a parallel increase of more valuable teaching acts and without reducing the time on the task or raising the amount of students' inappropriate behaviours.

Some managerial tasks can be committed to students by using teaching strategies like the Mosston's task style of teaching or the individual style of teaching. The teacher is freed from organization functions in a way that he is able to be more student-centred (M. Mosston, 1976; N. J. Dougherty, 1971). The implementation of these teaching styles induces a temporary rise of the managerial functions.

The ratios of organizational events significantly differed ($P = \cdot 01$) between elementary (25·1%) and senior high school (31·3%) levels in female teachers, while female and male teachers did not differ significantly.

There was a slight trend showing an increase of these functions in female teachers and a decrease in male teachers.

b. Evaluative functions

These functions deal with approving and disapproving statements related to the students' performance. The meaning of these categories is in some way restricted when compared to the definition of augmented feedback provided by S. Fishman and W. Anderson (1971) and used by M. Pieron and C. Devillers (1978) and S. Fishman and C. Tobey (1978): "a teaching behaviour dependent upon the motor response of one or more students and intended to provide information related to the acquisition of performance of a motor skill".

The data indicates that according to the quality of the students' performance, the teacher's statements fix new standards, new norms of performance, determine how the students must change their performance to conform with the proposed model.

Most often, evaluation is directed to a single student. In a specific observation we observed that a teacher directed 72% of their feedback to an individual, 6·5% to a group, and 21·5% to the whole class. The trend was more emphasized in student-teachers who directed 80% of their feedback to a single pupil (M. Pieron and C. Devillers, 1978).

Table 3 — **Distribution of various teaching functions in junior high school teachers**

Teaching functions	Female teachers			Male teachers		
	Mean	Min.	Max.	Mean	Min.	Max.
Organization	28·6	22·0	33·7	35·6	26·4	46·8
Content	20·3	18·2	24·2	22·3	17·0	26·8
Development	6·8	1·9	12·1	5·7	4·0	10·2
Personalization	3·0	1·8	5·2	3·0	1·9	6·1
Positive evaluation	13·2	6·4	18·7	9·4	7·9	13·5
Negative evaluation	16·5	9·9	23·8	14·5	9·1	20·9
Concretization	6·0	2·5	7·8	5·9	1·8	16·5
Positive affectivity	2·9	0·6	6·7	1·6	0·8	2·4
Negative affectivity	2·9	1·5	5·0	2·1	0·0	3·8

Determining the intervention rate turns out to be very useful when one intends to compare different studies or different educational settings. The intervention rate corresponds to the amount of events of a same function per time unit. With one exception, the intervention rate of evaluative functions is remarkable consistent in different kinds of teachers: in women one evaluation every 21·1 sec at the elementary level, one evaluation every 22·6 sec at junior high school level, one evaluation every 23·1 sec at senior high school level, in male teacher one evaluation every 21·8 sec at senior high school level. The only exception is found in male teachers at the junior high school level where one evaluative statement occurred every 36·4 sec.

These intervention rates do not significantly differ, except between male and female teachers at junior high school level and between the two groups of male teachers.

These rates appeared to be slightly lower than those which were recorded in female student-teachers in physical education: one feedback every 18 sec. They represent half the intervention rate of a co-operating teacher at the senior high school level: one feedback every 11 sec (M. Pieron and C. Devillers, 1978). Belgian teachers provided much more evaluative statements than indicated by data from S. Fishman and C. Tobey, 1978: an average of a little more than one a minute.

Evaluative statements related to the total of teachers' behaviours tend to decrease with the students' school level, in female teachers; a reverse trend appeared in male teachers. All these comparisons underscore the great variation range of this vital function aiming at changing the students' motor behaviours.

Although we are delighted to point out the occurrence a large proportion of individual events, it must be underscored that because of this individual character, one cannot expect more than one or two personal direct interactions between a teacher and a single student in each physical activity session.

Table 4 — **Distribution of various teaching functions in senior high school teachers**

Teaching functions	Female teachers			Male teachers		
	Mean	Min.	Max.	Mean	Min.	Max.
Organization	31·3	26·7	41·2	30·1	15·9	38·9
Content	21·3	18·8	22·9	19·0	11·8	28·9
Development	5·2	2·9	9·8	5·3	3·9	8·1
Personalization	3·4	1·0	5·5	1·0	0	2·1
Positive evaluation	11·7	9·2	14·6	14·4	5·4	19·8
Negative evaluation	15·1	6·3	23·6	22·2	10·9	29·7
Concretization	8·2	2·0	15·3	3·6	0	5·8
Positive affectivity	3·2	0·4	4·5	2·9	0·6	7·9
Negative affectivity	1·4	0·5	3·5	1·3	0	2·7

Compared through the Wilcoxon matched-pairs singed-ranks test the ratios of negative evaluations differed significantly from positive evaluations; proportions of negative evaluations varied according to the school grade level. In female teachers, there exist significant differences between elementary and junior high school levels ($P = \cdot 05$) and between elementary and senior high school levels ($P = \cdot 10$). These differences showed a decrease of the proportions of negative statements as school grade level raised.

In male teachers, a higher ratio of negative evaluations were observed at the senior high school level. In addition, positive evaluations were more frequently provided to older students by female than by male teachers.

Significant differences appeared between the elementary and junior high school level in girls and junior and senior high school levels in boys. It is noteworthy that the content analysis showed that negative evaluations are not completely independent from the subject taught.

Several male teachers chose to teach team sports skills. Competition implies many refereeing events. Some of them take the form of a negative sanction by loosing the ball.

The high proportion of negative reactions to students' performance seemed to be in contradiction with some principles basic to new curricula in physical activities. It is well known that positive reinforcement produces long term effects and negative reinforcement is mainly a short term modifier of behaviour. Why not be more positive in the evaluation?

c. Functions of content, development and personalization

The first category takes into account statements dealing with the subject, the matter taught. It represents from 19 to 22% of the events recorded. It does not vary according to grade or sex.

The observational system proposed by De Landsheere and Bayler underestimate this category by using a structural unit. Content statements generally last more than other types of events. The amount of events give only a guess of the importance of this category. It is a weakness of the De Landsheere-Bayer analysis system.

Our present observations do not completely confirm differences previously underscored between various groups of male and female student-teachers. Observations based on a time unit showed that male student-teachers were content-centred (M. Pieron, 1978).

It is worthwhile to compare proportions of content functions to those of development and personalization. The first are subject-centred, the second, development and personalization focus more on student. They amplify the pupil's contribution or attempts to solve some individual problems. They appeal more to the students' reflexive abilities. Moreover behaviours are directly chosen according to their strengths and weaknesses. The balance between the two groups of teaching events are roughly three to one.

This ratio reveals that although teachers are still content centred, they are trying to adopt an approach wherein the student plays a more prominent role. This tendency suits the theoretical and methodological approaches developed in the State or community curriculum.

Differences between development and personalization categories according to grade level and sex remained low and non-significant.

d. Functions of affectivity

These categories comprise teachers' statements and attitudes reinforcing, praising, recognizing students' merits on one side and statements and attitudes criticizing, punishing, threatening on the other side.

No significant differences appeared in the comparison.

At the elementary level, a trend to use more affective behaviours was observed.

Positive and negative affective behaviours were balanced at each level. As in evaluative behaviours, it seems to be advisable that teachers use positive affective interventions more frequently. However, we are aware that negative affective behaviours are inescapable particularly when many freedoms are left to the students in focusing on personalization and development functions. By applying positive behaviours teachers might emphasize the affective dimensions of physical activities. Do not forget that the affective aspects of physical education are directly linked to the students lifetime involvement long after the end of their school obligations.

e. Concretization functions

They include events using a technique aiming at representing the movement; skill demonstration and audio-visual aids enter this category.

These events accounted for low percentages, from 3·6 to 8·2. Differences between elementary and senior high school levels reached a ·10 level of significance.

High school female teachers used these behaviours more frequently. The infrequent occurrence of concretization functions showed that there were very few incidents of imitative learning by students. In USA, W. Anderson and G. Barrette (1978) observed that teachers employ very few skill demonstrations or visual aids.

CONCLUSIONS

Although having pointed out some significant differences in the use of some teaching functions such as organization and evaluation, by female and male teachers and between various grade school level, it is difficult to identify the basic differences in interaction patterns followed by teachers.

Organizational functions hold a prominent place in the rank order of teaching functions. It played an indispensable managerial role in preparing the most favourable learning conditions. However, organizational functions possess a low intrinsic value in the teacher-student interactions. The distribution of teaching functions allows us to suggest the teacher reduce

these functions for more valuable events in the interaction with students.

Negative evaluations were predominant when compared to positive evaluations. This ratio seems contradictory when the affective dimension of physical education is considered. It is difficult to imagine that people will engage in sport involvement over their lifetime when their previous experiences are based on negative reinforcement and when weaknesses are regularly stressed.

A more frequent use of positive affectivity compared to negative affectivity seems rationale and prudent in achieving long term physical education goals. One must recommend that teacher to be as positive as possible towards students.

Relationships between content, development and personalization categories showed that teachers' interventions are more subject-centred than students-centred. Nevertheless the students individual characteristics are used in a non-negligable manner.

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